Roof Collapse from Overloading by Snow and Ice

What To Know

- What is the live load design of all sections of the roof? This will let you know how much snow the roof can safely handle. Contact a structural engineer to determine live load if unknown. Structural reinforcement should be performed, especially on lower roofs, as needed.
- Inspect and clean roof drains, gutters and downspouts.
- Solicit a local roofing contractor for assistance in clearing roofs.

Essentials to Prevent Collapse

- Keep roof drains clear of ice and accumulated debris, inspect immediately after precipitation of more than 8 inches or snow fall and/or 2 inches of rain fall within 24 hour period;
- Keep gutters and downspouts running freely;
- Provide heat-tracing in gutters and downspouts;
- Keep the bottom of downspouts clear of snow and ice so the water has a place to drain;
- Truncate downspouts 2 feet above grade to ensure they flow freely and do not freeze at the bottom;
- Ensure snow is not plowed or shoveled against downspouts;
- Remove snow accumulations from roof when approximately 50 % of design strength is reached.

Signs of Potential Roof Collapse

- Sagging roof steel – visually deformed;
- Cracked or split wood members;
- Sprinkler heads pushed down below ceiling tiles;
- Door(s) that pop open;
- Door(s) or window(s) that are difficult to open;
- Bowed utility pipes or conduit attached at ceiling;
- Creaking, cracking or popping sounds, in general;
- Plumb bobs or laser leveling tools can be used to track bowing of truss bottom chords or web members; bowing of rafters or pulins; bowing of headers or columns

Snow Removal

- Drifted snow should be removed first, generally from lower roofs, rooftop mechanical vents, skylights, parapet walls, and around penthouse walls;
- Remove snow from the middle of the bays first, i.e. from center of the bay starting at the peak and working toward the eave. Repeat this on all bays;
- Remove snow evenly from both sides of the roof so that the live load on one side of the roof is not significantly greater than the other. For peaked roofs, start snow removal from the center of a given bay on one side and then from the same bay on the other side of the ridge;
- DO NOT pile snow from upper roofs onto lower roofs;
- Take care when removing snow to prevent damage to the roof membrane and avoid removal within two inches of the membrane. Use of plastic snow shovels recommended;
- When removing snow from one section of a roof, avoid travelling over and compacting snow on adjacent roof sections;

General Comments

- Contact a structural engineer if the roof is deflecting without an apparent load source;
- Roof clearing is much different than clearing of a parking lot, snow removal techniques must take into account the structural elements supporting the roof and plan for any additional elements like drift walls, parapets, roof drainage, multiple roof levels, etc.;
- Visually inspect the supporting member for the roof decks, i.e. direction of run for roof trusses, removing snow and ice in a cross direction to these supports;
- Identify location of interior roof drains and determine if they are clear or frozen;
- Rope off work area(s) and include a set back;
- Mark access point to roof edge;
- Secure drop areas below the roof edge;
- Two way radio communication is essential;
- Limit access to the roof;
- Do not pile snow from one roof onto another;
- Always completely remove the snow from the roof as you clear it.

References: *Snow Loading Roof Collapse; Zurich Services Corporation; Schaumburg, IL; Nov. 2003.*

Snow and Ice Loads; Safe Roof Systems, Inc.; Mattapoisett, MA; July 2009.

For additional information refer to the following websites:

www.zurichservices.com

www.saferoofsystems.com